

CLAIMS

1. An optical recording medium having a data recording area in which data can be rewritten and a write-once area in which data
5 can be written only once and not be erased, wherein

in the data recording area, a reflectance ratio of a part where the data is recorded is different from a reflectance ratio in a part where the data is not recorded, and

10 a reflectance ratio of a recording pit formed in the write-once area is higher than the higher one of the reflectance ratio in the part where the data is recorded and the reflectance ratio in the part where the data is not recorded in the data recording area.

15 2. The optical recording medium according to claim 1, wherein a medium specific ID which is specific to an optical recording medium is recorded in the write-once area.

20 3. The optical recording medium according to claim 1, comprising a recording layer, and a reflection layer which is arranged farther from a plane of incidence of a light than the recording layer, wherein the data is recorded in the write-once area by reduction of a thickness of a recording film due to deformation of the recording film.

25 4. The optical recording medium according to claim 1, wherein a recording pit of the write-once area is recorded with heat amount in a range from twice to four times heat amount necessary for rewriting the recording pit of the data recording area.

5. The optical recording medium according to claim 1, wherein a recording pit of the write-once area is formed by irradiating a laser beam modulated in a multi-pulse modulation.

5 6. The optical recording medium according to claim 1, wherein the write-once area and the data recording area have the same sector structures, and a start position of recording the data in the write-once area coincides with a start position of the sector.

10 7. The optical recording medium according to claim 1, wherein a recording layer of a sector just before a sector to be recorded with the data in the write-once area is initialized to a crystallization state.

15 8. The optical recording medium according to claim 1, wherein an address of the write-once area is recorded by a wobble modulation of a groove, and a recording pit in the write-once area is recorded in synchronization with a position where the wobble amount of the groove is maximum.

20 9. The optical recording medium according to claim 1, wherein an address of the write-once area is recorded by a wobble modulation of a groove, and a recording pit in the write-once area is recorded in synchronization with a position where the wobble
25 amount of the groove is minimum.

10. The optical recording medium according to claim 2, wherein the medium specific ID is encrypted with a public key which is generated from information related to the position where the
30 medium specific ID is recorded and a private key.

11. The optical recording medium according to claim 2,
having a lead-in area for storing predetermined control information,
the lead-in area storing determination information indicating if the
5 optical recording medium has the medium specific ID.

12. The optical recording medium according to claim 1,
wherein an area for storing information of a key set used for
revoking, the write-once area, a lead-in area for storing
10 predetermined control information, and the data recording area are
formed in this order from an inner periphery of the optical
recording medium.

13. An apparatus for recording data on an optical recording
15 medium having a data recording area in which data can be rewritten
and a write-once area in which data can be written only once and not
be erased, comprising:

an optical head operable to irradiate a laser beam to
the optical recording medium to record the data;

20 a laser driver operable to control an operation of
recording the data by the optical head; and

a controller operable to control an operation of the
laser driver;

25 wherein the controller performs the control so that the
laser beam having heat amount in a range from twice to four times
heat amount necessary for recording the rewritable data in the data
recording area is irradiated to the write-once area to record the
data.

30 14. A recording apparatus according to claim 13, wherein the

controller performs the control so that a medium specific ID that is specific to the optical recording medium is recorded in the write-once area.

5 15. The recording apparatus according to claim 13, further comprising a multi pulse generator operable to output a laser beam including a plurality of pulses for generation of a recording pit.

10 16. The recording apparatus according to claim 13, wherein the write-once area and the data recording area have the same sector structures, and the recording apparatus further comprises a recording timing generator operable to generate a recording timing so that a start position of recording the data in the write-once area coincides with a start position of the sector.

15 17. The recording apparatus according to claim 13, further comprising: a mechanism operable to move the optical head to a sector just before a sector in which data to be reproduced is recorded in the write-once area during the reproduction operation of
20 the data in the write-once area; and a write-once signal demodulator operable to hold a reproduction level of the just before sector and reproduce the data on the basis of a level that is a predetermined number of times the held reproduction level.

25 18. The recording apparatus according to claim 13, further comprising a PLL operable to extract a clock from a wobble of a groove in the write-once area, and a pulse generator operable to generate a signal in synchronization with the wobble from the output of the PLL and record the generated signal in synchronization with a
30 position where the amount of the wobble is maximum.

19. The recording apparatus according to claim 13, further comprising a PLL operable to extract a clock from a wobble of a groove in the write-once area, and a pulse generator operable to generate a signal in synchronization with the wobble from the output of the PLL and record the generated signal in synchronization with a position where the amount of the wobble is minimum.

20. The recording apparatus according to claim 14, further comprising an encryptor operable to encrypt the medium specific ID with a public key which is generated from information related to the position where the medium specific ID is recorded and a private key, the medium specific ID being recorded after being encrypted.

21. The recording apparatus according to claim 13, further comprising an encryptor operable to encrypt data to be recorded with the medium specific ID, the data to be recorded being recorded in the write-once area after being encrypted.

22. The recording apparatus according to claim 17, further comprising a section operable to reproduce the data in the write-once area, and a decryptor operable to decrypt the reproduced data with the medium specific ID.

23. The recording apparatus according to claim 13, wherein the controller makes rotational speed of the optical disk for reproduction of the write-once area lower than rotational speed for reproduction of the data recording area.